A New Theory of the Solar System

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Abstract: Here we show that the Titius-Bode (TB) law is a characteristic feature of the surroundings of various types of black holes. Only a star that is a remnant of a black hole may be surrounded by rings (or planets) whose radii (or semi-major axes) are defined by TB law. We explained the origin of Neptune and other massive planets, Kuiper belt and Oort cloud. We also described mathematically the 11-year sunspot cycle.

1. Introduction

The Titius-Bode (TB) law results from symmetrical decays of atomic nuclei or virtual/real bosons. Such decays can occur at densities close to the nuclear-plasma density, so they take place in accretion discs of gravitational black holes (BHs) and inside baryons around their cores which are black holes with respect to the nuclear strong interactions [1]. Notice that in hot nuclear plasma with density higher than $\sim 2.4 \cdot 10^{17}$ **kg/m³**, relativistic mass of nucleons does not appear so calculations are very simple [2].

2. The Titius-Bode law for the baryons and black holes with accretion discs

An atomic nucleus or a virtual boson appearing at the equator of a BH moves away from it by a distance B and there decays into two identical parts, one of which moves radially towards the equator, the other in the opposite direction and stops at a distance B from the place of decay at the same time as the other part reaches the equator. This smaller part re-decays symmetrically at 2B, and the process repeats, and so on. Such phenomena lead to the TB law in the plane of the equator

$$R_d = A + d\,B\,, \quad (1)$$

where A is the equatorial radius of the BH, B is the range of the initial atomic nucleus or virtual boson, and d = 0, 1, 2, 4, 8, 16,… The equatorial radius of a BH is defined as radius of a circle on which the spin speed of particles is close to the speed of light in “vacuum” c = 299,792,458 **m/s**.

The A/B ratio is invariant for all scales and types of BHs and is defined by the condition that the radius A is determined by the nuclear weak interactions and the range B is determined by the electroweak interactions.

We will now show that as the mass of a BH decreases, A and B increase.

For an object with a mass m on an orbit with a radius R we have

$$R = G_i\, M / v_{orbital}^2 \,, \tag{2}$$

where $M >> m$, M is mass of a BH, G_i is the constant of interactions of M with m, and $v_{orbital}$ is the orbital speed of m.

From the law of conservation of angular momentum we have

$$m\, v_{orbital}\, R = \text{const.} \,. \tag{3}$$

Assume that over time the mass m changes only insignificantly. Then from (2) and (3) is

$$R \sim 1 / M \,. \tag{4}$$

On the other hand, the definition of coupling constants α_i is

$$\alpha_i = G_i\, M\, m / (c\, \hbar) \,, \tag{5}$$

so from (4) and (5) we have

$$R \sim 1 / M \sim 1 / \alpha_i \,. \tag{6}$$

By applying (6) to the ratio A/B we obtain

$$A / B = (\alpha_{w(proton)} + \alpha_{em}) / \alpha_{w(proton)} = 1.3898 \,, \tag{7}$$

where $\alpha_{w(proton)} = 0.0187229$ is the coupling constant for the nuclear weak interactions, and $\alpha_{em} = 1 / 137.036$ is the fine-structure constant – both couplings constants we calculated within the Scale-Symmetric Theory (SST) [1].

The range of the nuclear strong interactions shows that the $d = 4$ defines the last orbit in baryons [1]. On the other hand, in accretion discs around BHs, there are created 10 + 1 rings with higher matter density – their radii are:

A relates to atomic mass number equal to 256 – it is before the symmetrical decay – in Section **4** we will show that today it is the semi-major axis of Mercury,
$A + B$ relates to atomic mass number 256 **too** – it is before the symmetrical decay (for Venus),
$A + 2B$ relates to 128 (for Earth),
$A + 4B$ relates to 64 (for Mars),
$A + 8B$ relates to 32 (for the asteroid/dwarf-planet Ceres),
$A + 16B$ relates to 16 (for Jupiter),
$A + 32B$ relates to 8 (for Saturn),
$A + 64B$ relates to 4 (for Uranus),
$A + 96B$ relates to 3 (for Neptune): such nucleus breaks the SST symmetry called the saturation of interactions (see next Section) but because the helium-3 is the stable isotope so it can accumulate in the colder/outer regions of the accretion discs,
$A + 128B$ relates to 2 (for Pluto),

A + 256B relates to 1 (?): it is outside the Kuiper cliff so such orbit can be empty – see Section **7**. (8)

Emphasize that ranges of objects are inversely proportional to their masses.
For the Earth we have

$$A + 2B = 1 \textbf{ au} . \quad (9)$$

From (7) and (9) we obtain A = 0.41 **au** and B = 0.295 **au**.

3. The SST symmetry called the saturation of interactions

Why in the previous Section we start from the atomic mass number equal to 256? To answer this question we must describe the symmetry introduced in SST which we call the saturation of interactions.

In SST, such symmetry plays very important role. It applies to many particles and cosmic objects, for example, to the lightest neutrinos or to the neutron black holes (NBHs) the BHs consist of.

Suppose a system has four parts, each of which has four fragments. Then the three fragments of each part interact with the other three parts, and the fourth fragment represents the fourth part. We can see that if a part of the system consists of 4^1 parts (generally, X^1 parts), the whole system consists of $16 = 4^2$ fragments (generally, X^2 fragments). The generalization of such saturation of interactions leads to the following sequence

$$S \equiv X^1 \rightarrow X^2 \rightarrow X^4 \rightarrow X^8 \rightarrow X^{16} \rightarrow \ldots \quad (10)$$

Formula (10) suggests that due to the saturation of interactions and the superluminal quantum entanglement [1], structures can contain following number of identical fragments

$$N_d = 4^d \text{ or } 2 \cdot 4^d \text{ for binary systems of fragments,} \quad (11)$$

where d = 0, 1, 2, 4, 8, 16, 32 are for flattened spheroids, and d = 3, 6, 12, 24 are for chains.

Formula (11) and the Periodic Table of Elements lead to conclusion that we should start from atomic nuclei containing $4^4 = 256$ nucleons.

4. Mathematical cosmogony of the Solar System

Assume that a progenitor of the Solar System was a black hole composed of $4^4 = 256$ NBHs so the mass of the progenitor was

$$M_{Progenitor} = 4^4 \, m_{NBH} = 1.263 \cdot 10^{34} \textbf{ kg} , \quad (12)$$

where $m_{NBH} = 24.81$ **solar masses** [2].

Now the central mass is

$$M_{Sun} = 1.9885 \cdot 10^{30} \textbf{ kg} . \quad (13)$$

From (6) results that the semi-major axes of the rings increased following number of times

$$F = M_{Progenitor} / M_{Sun} = 6352 . \quad (14)$$

At the beginning, the radius of the Mercury ring, $A_{Beginning}$, was equal to

$$A_{Beginning} = G\, M_{Progenitor} / c^2 = 9.379 \cdot 10^6 \ \mathbf{m}, \quad (15)$$

where $G = 6.6740007 \cdot 10^{-11}$ $\mathbf{m^3 / (kg\ s^2)}$ is the gravitational constant [1].
Now the semi-major axis of Mercury should be

$$A_{Now} = F\, A_{Beginning} = 5.958 \cdot 10^{10} \ \mathbf{m} = 0.398 \ \mathbf{au} . \quad (16)$$

This value is very close to the actual semi-major axis of Mercury $A_{Mercury,actual} = 0.387$ **au**. The difference is ~3%.

5. The ratio of the mass of the Sun to the total mass of the Solar System

Can we show that the relationships between the gravitational black holes and the strong black holes in baryons are not only related to the TB law? Yes.

Mass of the charged core of baryons is $M_{Core} = 727.44$ MeV [1]. It interacts electromagnetically via the electron-positron pairs which mass is $m_{Pair} = 1.022$ MeV. Creations and annihilations of such pair appear outside the baryon core. Assume that mass of the Sun, M_{Sun}, relates to M_{Core} while the sum of the masses M_{Core} and m_{Pair} relates to the total mass of the Solar System $M_{Solar\text{-}System}$ – then we obtain

$$M_{Sun} / M_{Solar\text{-}System} = M_{Core} / (M_{Core} + m_{Pair}) = 0.9986 . \quad (17)$$

This value is in perfect agreement with the observational data – see page 10 in [3].

6. The present-day radius of the solar-system-like progenitor

6.1 The down-up analysis

Near the Sun, some 64 stars currently lie within 16.3 light-years (ly). Most of them are red dwarfs. On the assumption that a typical mass of red dwarf is 0.4 solar mass, we need

$$N = F / 0.4 \approx 16{,}000 \quad (18)$$

red dwarfs to obtain the mass of 256 NBHs.

On the assumption that number density of the red dwarfs near the Sun is constant, we obtain that ~16,000 red dwarfs occupy a sphere with a radius of

$$R_{Sphere} = 16.3 \text{ ly } (16{,}000 / 64)^{1/3} \approx 100 \ \mathbf{ly} . \quad (19)$$

It is the present-day radius of the solar-system-like progenitor.

6.2 The up-down analysis

In the literature, there are uncertain results on the size and mass of the major parts of the massive galaxies, so here we estimate the typical values as follows.

*The thick disc contains about 0.1 of the stellar mass of typical massive galaxy and has a scale height of ~1,000 light-years.

*The disc extends from the nucleus centre out to approximately ~75,000 light-years.

*A typical baryonic mass of such galaxies is 4^{16} NBHs [4].

*From **6.1** results that the today radius of the remnant of the progenitor containing $4^4 = 256$ NBHs should be ~100 light-years (i.e. its size is ~200 light-years) so in the ~1,000 light-years thick disc there should be ~5 layers of the solar-system-like systems.

On such assumptions, for a typical massive galaxy, we obtain:

*There were

$$4^{16} / 4^4 = 4^{12} \qquad (20)$$

the solar-system-like progenitors.

*Along the radius of the thick disc there should be

$$X \approx (4^{12} \cdot 0.1 \cdot 0.2 / \pi)^{1/2} = 327 \textbf{ progenitors} . \qquad (21)$$

*The today size of the progenitor should be

$$D \approx 75{,}000 \text{ ly} / 327 = 230 \textbf{ light-years} , \qquad (22)$$

so the radius is ~100 light-years as it should be.

7. The origin of the Kuiper cliff at ~50 au

We know that the number of objects in the Solar System's Kuiper belt fall off rapidly beyond a radius of ~50 au. Why?

From formula (6) follows that radius is inversely proportional to coupling constant. Assume that on the inner edge of the initial accretion disc dominated the nuclear strong interactions (the spin speed is close to c) so for $A_{Beginning}$ we have $\alpha_{strong} = 1$ (it is for the laminar motions so the relativistic mass does not appear) [1], while on the outer edge of such disc dominated the electromagnetic interactions at high energy so for radius of the outer edge of the disc, $R_{outer-edge}$, we have $\alpha_{em,high-energy} = 1 / 127.67$ [5]. This leads to following formula

$$R_{outer-edge} = A_{Beginning}\, \alpha_{strong} / \alpha_{em,high-energy} = 1.197 \cdot 10^9 \textbf{ m} . \qquad (23)$$

Today it should be F times bigger

$$R_{cliff} = F\, R_{outer-edge} = 7.606 \cdot 10^{12} \textbf{ m} = 50.8 \textbf{ au} . \qquad (24)$$

8. The origin of the Oort cloud

8.1 Formation of the outer and inner parts of the Oort cloud

The Oort cloud contains the long period comets and extends from between ~2,000 and ~5,000 au to ~200,000 au from the Sun [6]. The models based on the observations of the comets suggest that the Oort cloud is divided into two regions: a spherical outer cloud and a scattered disc [7]. As the distance from the Sun increases, the scattered disc expands more and more in the directions transverse to the disc.

Here we show that the Oort cloud was formed due to the scattering of matter on the Mercury orbit during the type-Ia supernova (SN) explosion.

In SST, the key role in fermions plays torus [1]. The strong interactions in baryons are associated with the radial motions of gluons emitted by a torus – such interactions, because of the internal structure of the torus, are possible only in hadrons. The electromagnetic interactions relate to the toroidal motions in the plane of the equator of the torus, while the weak interactions relate to the poloidal motions. We can see that the three motions are orthogonal! The poloidal motions are perpendicular to the equatorial plane of the torus so they scatter the radial and toroidal motions.

Most of matter on the Mercury orbit, because of the conservation of the angular momentum, was scattered in the plane of the Mercury orbit. The scattered disc-like region in the Oort cloud is a result of the increasing spin speed of the thin matter torus that overlapped with the Mercury orbit so it was due to the electromagnetic interactions at high energy. On the other hand, the spherical region in the Oort cloud is a result of a volumetric expansion of the thin torus – there appeared the radial motions so it was due to the nuclear strong interactions.

From (6) results that the radius of the Mercury orbit, $A_{SN\text{-}Ia}$, just before the supernova explosion, was

$$A_{SN\text{-}Ia} = A_{Now}\, M_{Sun} / M_{SN\text{-}Ia} = 0.2853 \textbf{ au} , \qquad (25)$$

where $M_{SN\text{-}Ia} = 1.395$ **solar masses** [2].

The inner radius, $R_{Oort,inner}$, of the inner edge of the scattered disc in the Oort cloud follows from the transition from the electromagnetic interactions at high energy on the Mercury orbit to the weak interactions of electrons on the inner edge of the scattered disc. From formula (6) follows that radius is inversely proportional to coupling constant so we have

$$R_{Oort,inner} = A_{SN\text{-}Ia}\, \alpha_{em,high\text{-}energy} / \alpha_{w(electron\text{-}muon)} \approx 2{,}300 \textbf{ au} , \qquad (26)$$

where $\alpha_{w(electron\text{-}muon)} = 0.951108 \cdot 10^{-6}$ is the coupling constant of the weak interactions of electrons [1]. The “mixture” of the toroidal electromagnetic motions and the radial strong motions caused that with increasing distance from the Sun, the scattered disc expands more and more in the directions transverse to the disc.

The intermediate semi-major axes for the objects in the scattered disc we obtain for the mixed interactions in the Mercury orbit, here they are the strong and electromagnetic interactions.

The inner radius, $R_{Oort,inner\text{-}sphere}$, and outer radius, $R_{Oort,outer\text{-}sphere}$, of the spherical region in the Oort cloud result from the transition from the nuclear strong interactions on the Mercury orbit to the weak interactions of electrons on the most distant sphere. But during the supernova explosion, on the Mercury orbit appeared the turbulent motions so baryons had the relativistic masses. In such nuclear plasma, the coupling constant of the nuclear strong interactions is the running coupling – inside baryons it changes from $\alpha_{strong,asymptote} = 0.1139$ to $\alpha_{strong} = 1$ [1]. Such values define the inner radius and outer radius of the spherical region in the Oort cloud

$$R_{Oort,inner\text{-}sphere} = A_{SN\text{-}Ia}\, \alpha_{strong,asymptote} / \alpha_{w(electron\text{-}muon)} \approx 34{,}000 \textbf{ au} , \qquad (27a)$$

$$R_{Oort,outer\text{-}sphere} = A_{SN\text{-}Ia}\, \alpha_{strong} / \alpha_{w(electron\text{-}muon)} \approx 300{,}000 \textbf{ au} = 4.74 \textbf{ ly} . \qquad (27b)$$

The nearest-known star to the Sun is Proxima Centauri ad distance 4.24 light-years so it is inside the spherical part of the Oort cloud, but close to its edge.

The weak interactions of the electrons are very weak in relation to the strong and electromagnetic interactions of baryons so we neglect a deformation of the Oort cloud resulting from the poloidal motions.

We can see also that the mass of the Oort cloud should be close to the mass of the thin torus which overlapped with the Mercury orbit so it should be close to masses of planets.

Notice also that for the weak interactions of nucleons ($\alpha_{w(proton)} = 0.0187229$ [1]) we obtain

$$R^*_{Oort} = A_{SN\text{-}Ia}\,\alpha_{w(proton)} / \alpha_{w(electron\text{-}muon)} \approx 5{,}600\ \mathbf{au}\ , \quad (28)$$

so for such and bigger distances, the number density of comets should be higher. Moreover, such a region should be deformed due to the poloidal motions.

We showed that SST leads to a spherical outer Oort cloud that should extend from ~34,000 **au** to ~300,000 **au**, while a scattered-disc inner Oort cloud should extend from ~2,300 **au** to ~34,000 **au**.

8.2 Stability of the outer Oort cloud

Why, unlike the radii of the planetary rings, did not the semi-major axes of the long-period comets in the Oort cloud increase in size following the SN-Ia explosion?

The thin torus of the nuclear plasma with its internal nuclear strong interactions, which overlapped with the orbit of Mercury, shielded the planetary ring system from destruction and mass changes during the supernova explosion.

Moreover, such a thin torus caused the disc part of the Oort cloud to be scattered.

Over time, as part of the ejected mass by the supernova (about 0.4 solar mass) flowed through the just formed Oort cloud, the masses of the components of this cloud increased, but on the other hand, the decreasing central mass decreased the orbital speeds of the comets. Since the orbital angular momentums of comets must be conserved, which is the product of mass, orbital velocity, and orbital radius, the semi-major axes of comets, contrary to the radii of the planetary rings, should not change significantly – they could decrease as well.

The mechanism of the formation and evolution of the Oort cloud described in this Section differs significantly from that proposed in mainstream astrophysics. Under the mainstream mechanism, unlike the one presented here, we cannot accurately predict the properties of the Oort cloud. We can see, however, that the appearing free parameters in the mainstream mechanism allow us to obtain values of some physical quantities consistent with the observations, but such additional parameters strongly distort the physical picture. Therefore, I warn against theories, models and simulations in which there are free parameters.

From the observations results that a mean mass of the long-period comets is about $5 \cdot 10^{12}$ kg – the estimated masses of a set of long-period comets are $[0.5, 10] \cdot 10^{12}$ kg [8]. The number of long-period comets is $\sim 10^{12}$ [9].

9. Semi-major axes of Saturn, Uranus and Neptune from the initial opaque torus

From observational data results that the more massive black holes (as, for example, in quasars) are surrounded by an opaque torus. Assume that our black hole composed of the 256 NBHs also was surrounded by such a torus. Assume also that the characteristic sizes of the black hole and its torus were directly proportional to the sizes in the core of baryons [1].

On the assumption that the radius of the central condensate in baryons relates to the present-day semi-major axis of Mercury, $A_{Mercury,actual} = 0.387$ **au**, we obtain that the today mean distance of the initial opaque torus from the Sun, $R_{Torus,mean}$, should be

$$R_{Torus,mean} = A_{Mercury,actual} / \alpha_{w(proton)} \approx 20.7\ \mathbf{au}\ , \quad (29)$$

while its today equatorial radius, $R_{Torus,equator}$, should be

$$R_{Torus,equator} = R_{Torus,mean}\ 3/2 \approx 31.0\ \mathbf{au}\ . \quad (30)$$

We can see that the calculated distances are close to the present-day semi-major axes of the Uranus (19.2 au) and Neptune (30.1 au) respectively.

Notice that in our model, there should be formed the Neptune even when the symmetry describing the symmetrical decays is not broken.

Today, the inner radius of the opaque torus, $R_{Torus,inner}$, should be equal to 1/3 of its equatorial radius

$$R_{Torus,inner} = R_{Torus,equator} / 3 \approx 10.3 \text{ au} . \quad (31)$$

This value is close to the semi-major axis of the Saturn (9.5 au).

In Table 1, we compared the observed semi-major axes, R_{SM-O}, of the Saturn, Uranus and Neptune with semi-major axes calculated from the sizes of the opaque torus, R_{SM-T}, (formulae (29), (30) and (31)) and from the TB law that follows from the symmetrical decays of the atomic nuclei (R_{SM-TB} [au] $= 0.41 + d \cdot 0.295$, where $d = 32$, 64 and 96).

Table 1 *Comparison of semi-major axes*

R_{SM-O} [au] from observations		R_{SM-T} [au] from opaque torus	$R_{SM-T} - R_{SM-O}$ [au]	R_{SM-TB} [au] from TB	$R_{SM-TB} - R_{SM-O}$ [au]
Saturn	9.6	10.3	+0.7	9.9	+0.3
Uranus	19.2	20.7	+1.5	19.3	+0.1
Neptune	30.1	31.0	+0.9	28.7	–1.4

Table 1 shows that in the case of Neptune and Uranus, contrary to the Neptune, the distribution of matter that was a result of the symmetrical decays of the atomic nuclei dominated over the distribution of matter forced by the sizes of the opaque torus.

Initially, the orbits of Saturn, Uranus and Neptune were additionally fed with matter from the opaque torus so the three planets are today the massive planets. But why is the Jupiter the most massive planet? Initially, the inner accretion disc (i.e. from the black hole to the opaque torus) also was fed with matter from the opaque torus. On the other hand, the Jupiter orbit was the closest orbit to the inner boundary of the opaque torus – it is the reason that today Jupiter is the most massive planet.

10. The 11-year sunspot cycle

Since the Sun rotates and there is the nuclear plasma so there should be created two vortices with parallel spins one composed of protons, ions and neutrons and a second composed of electrons. But then magnetic fields created by the two vortices are antiparallel so it forces one of them to rotate 180 degrees. But then the two vortices are spinning in opposite direction so it should destroy them. It leads to conclusion that the most stable state is when they are perpendicular (Fig.1). Consider the forces acting on the vortex of protons – it produces circular current. The vortex of electrons creates magnetic field with magnetic line of force overlapping with a diameter of the vortex of protons. The Fleming’s Left Hand Rule shows how the magnetic axis of the vortex of protons rotates – it is the origin of the 11-year sunspot cycle.

How often does the sun’s magnetic field flip?

From SST we know that time of interaction is inversely proportional to coupling constant while coupling constant is directly proportional to involved mass [1]. It leads to conclusion that period of spinning is inversely proportional to involved mass. Mass of the electric charge of the protons is $X^+ = 318.2955$ **MeV** while the electromagnetic interactions of the vortex of electrons are via the bare electron-positron pairs $(e^+e^-)_{bare}$ = 1.020814 **MeV** [1] so the ratio of involved masses is

$$R_{X/(ee)} = X^+ / (e^+e^-)_{bare} = 311.8\,. \tag{32}$$

The sidereal solar rotation period on the equator of the Sun, $T_{Sidereal} \approx 25$ **days**, should be directly proportional to the period of spinning of the vortex of protons, while the period of the 360-degrees rotation of the magnetic axis of the Sun, $T_{Magnetic}$, should be directly proportional to the period of the spinning of the vortex of electrons so we have

$$T_{Magnetic} = T_{Sidereal}\, R_{X/(ee)} \approx 21.3 \textbf{ years}\,. \tag{33}$$

It leads to conclusion that a mean period of the sunspot cycle should be about 10.7 **years**. This value is consistent with observational data concerning the period from 1902 to 2009 [10] – there were 10 cycles, so we get an average value exactly equal to 10.7 years!

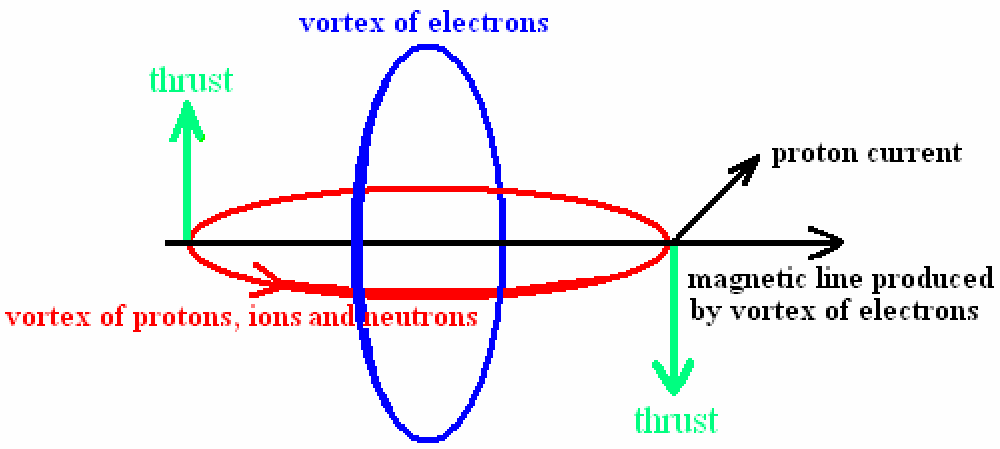

Fig.1
The 10.7-year sunspot cycle.

11. A brief cosmogony of the Solar System as a summary

It is impossible to understand the cosmogony of the Solar System without two new symmetries described here (i.e. saturation of interactions and symmetrical decays of atomic nuclei in nuclear plasma) and the assumption that our Universe is cyclical.

As a result of the collapse of our Universe, a dark-matter (DM) core of the Protoworld was created, and an early baryonic Universe inside such structure [4].

The early baryonic Universe consisted of two cosmic loops composed of the neutron black holes (NBHs). Due to the symmetry of the saturation of interactions and the superluminal quantum entanglement, NBHs were grouped into larger structures such as protogalaxies and galaxy clusters. The large-scale structure of the Universe we are seeing today was formed before it began to expand.

When dark matter collided with the associations of NBHs and dark energy flowed in, NBHs began to collide and most of them turned into nuclear plasma.

The cosmogony of the Solar System begins with a black hole containing 256 NBHs, which captures the extra NBH and converts it into an accretion disc.

Due to the symmetry of saturation of interactions and the symmetrical decays of atomic nuclei containing 256 nucleons, rings are formed in the accretion disc and then protoplanets whose orbital radii meet the Titius-Bode law.

Notice that there was a quantum resonance between the 256 NBHs in the black hole and the 256 nucleons in the atomic nuclei created in the nuclear plasma near the equator of the black hole.

The inflows of dark energy and dark-matter loops [4] cause that the black hole evaporates, ejecting matter mainly along its axis of rotation. This mechanism causes protoplanet orbital radii to increase.

When the central star's mass decreased to about 1.4 solar masses, it exploded as a supernova, a key moment for the survival of the Solar System. Our Sun was formed about 4.6 Gyr ago from the remnants of such an explosion.

The question is: where are the remaining fragments of the original black hole? New stars were formed from the nuclear plasma ejected along the axis of rotation, and these are stars scattered around the Solar System inside a sphere with a radius of about 100 light-years.

The only planet whose semi-major axis does not obey the TB law is Neptune, but note that the symmetry of symmetrical decays relates to hot nuclear plasma. Thus, this symmetry at the periphery of the accretion disc can be broken. Helium-4 is for Uranus and deuterium is for Pluto, so the orbit for the stable He-3 should have a semi-major axis which is the arithmetic mean of the semi-major axes of Uranus and Pluto – this is consistent with the observational data for Neptune.

Here we showed that the Titius-Bode law emerges from the straightforward dynamical considerations.

The Kuiper belt is the remnant of the outer edge of the initial accretion disc, while the Oort cloud is the remnant of the type Ia supernova explosion.

The Solar System is unique because its history goes back to the origins of our Universe and its structure could have been damaged many times.

Awakening
Friction and adhesion as the origins of physics
Matter won the war against antimatter
Dark energy inflates the Universe
The spiral codes as the fruits of chaos
Whitewashed trees still want to sleep
A sparrow looking for company
Time to wash the quark dirt off the face

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